

## Announcement for Bachelor/Master Thesis/Research project

# Different Topics for Datadriven Modeling Techniques in Building Energy Systems

### Motivation

The building sector is responsible for around 35% of the energy consumption in Germany. The state of the art controllers are rule-based, which don't utilize the thermal dynamics of the building. Optimization based controllers can reduce the energy demand, but need a model of the thermal dynamics. These models are primarily identified through measurements with a parametric model. Therefore the structure of the model needs to be known beforehand which imposes restrictions for the learnable dynamics.

Datadriven methods are a promising approach to model the thermal dynamics of a building. They still need a prior topology and hyperparameters, but the model is more flexible than state of the art parametric models. Furthermore, they are able to learn any nonlinear input output mapping present in the data.

### Task description

The exact topic is determined with the supervisor. Possible topics are learning the thermal dynamics with different datadriven methods like Neural Networks and their different topology, or investigating possible online adaptation schemes.

### Requirements

Basic knowledge with Python is required. Experience with datadriven methods is advantageous. The thesis can be written in either English or German.

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